

WHAT IS CLAIMED IS:

1. A device for recovering a solvent from a waste photopolymer plate washout fluid, comprising:

means for receiving and distilling the waste fluid;

5 means for supplying heat to the distilling means and to the waste fluid contained in the distilling means to distill the solvent from the waste fluid and reduce the waste fluid to a concentrated residue;

means for removing the solvent distilled from the waste fluid from the distilling means; and,

10 means for supplying a flash-point-increasing agent to the concentrated residue to increase the flash point temperature of the concentrated fluid residue.

2. The device as claimed in Claim 1, wherein the flash-point-increasing agent is an oil.

3. The device as claimed in Claim 1, wherein the flash-point-increasing agent is
15 selected from the group of oils consisting of paraffinic and naphthenic oils and a blend thereof.

4. The device as claimed in Claim 1, wherein the flash-point-increasing agent is a mixture of a paraffinic and naphthenic oils.

5. The device as claimed in Claim 1, wherein the flash-point-increasing agent is
20 added to the concentrated residue in an amount sufficient to increase the flash point temperature of the concentrated fluid residue to a predetermine temperature.

6. The device as claimed in Claim 1, wherein the flash-point-increasing agent is supplied to the waste fluid prior to being received by the distilling means.

7. The device as claimed in Claim 1, wherein the flash-point-increasing agent is supplied to the waste fluid within the distilling means.

8. The device as claimed in Claim 1, further comprising:

means for discharging the concentrated residue from the distilling means, and
5 wherein the flash-point-increasing agent is supplied to the concentrated residue while being discharged from the distilling means.

9. The device as claimed in Claim 1, further comprising:

means for discharging the concentrated residue from the distilling means, and
means for receiving and containing the concentrated residue discharged from
10 the distilling means; and,

wherein the flash-point-increasing agent is supplied to the concentrated residue within the containing means.

10. The device as claimed in Claim 1, further comprising:

means for measuring the amount of solvent removed from the distilling means;
15 and,

means for discharging the concentrated residue from the distilling means upon the removal of a predetermined amount of solvent from the distilling means.

11. The device as claimed in Claim 1, further comprising:

means for measuring the amount of waste fluid received by the distilling
20 means; and,

means for limiting the amount of waste fluid received by the distilling means to a predetermined amount, whereby accumulation of concentrated residue within the distilling means is limited.

12. A device for extracting a solvent from a waste photopolymer plate washout fluid, comprising:

a still for receiving and distilling the waste fluid;

a heat source operably connected to the still for providing heat to the still and the waste fluid contained therein to distill the solvent from the waste fluid and reduce the waste fluid to a concentrated residue;

a vacuum pump operably connected to the still for reducing the pressure within the still to assist in distilling the solvent from the waste fluid and reducing the waste fluid to a concentrated residue and to withdraw the solvent from the still; and,

means for combining a flash-point-increasing agent with the waste fluid to increase the flash point temperature of the concentrated residue.

13. The device as claimed in Claim 12, wherein the flash-point-increasing agent is an oil.

14. The device as claimed in Claim 12, wherein the flash-point-increasing agent is selected from the group of oils consisting of paraffinic and naphthenic oils.

15. The device as claimed in Claim 12, wherein the flash-point-increasing agent is a mixture of a paraffinic and naphthenic oils.

16. The device as claimed in Claim 12, wherein the flash-point-increasing agent is added to the concentrated residue in an amount sufficient to increase the flash point temperature of the concentrated residue to a predetermined temperature.

17. The device as claimed in Claim 12, wherein the flash-point-increasing agent is combined with the waste fluid prior to being received by the still.

18. The device as claimed in Claim 12, wherein the flash-point-increasing agent is combined with the waste fluid within the still.

19. The device as claimed in Claim 12, wherein the still has a dump opening and the flash-point-increasing agent is combined with the concentrated residue as the concentrated residue is discharged through the dump opening.

20. The device as claimed in Claim 12, further comprising:
means for measuring the volume of solvent withdrawn from the still; and,
means for discharging the concentrated residue from the still upon removal of a predetermined amount of solvent from the still.

21. The device as claimed in Claim 12, wherein the still has a dump opening, and further comprises:

an actuatable dump valve mounted to the still at the dump opening;
a solvent meter in fluid communication with the vacuum pump to measure the amount of solvent withdrawn from the still; and,

a controller operably connected to the meter and the dump valve to actuate and open the dump valve to empty the concentrated residue from the still upon the removal of a predetermined amount of solvent from the still.

22. The device as claimed in Claim 12, further comprising:

means for measuring the amount of waste fluid received by the still; and,
means for limiting the amount of waste fluid received by the still to a predetermined amount, whereby accumulation of the concentrated residue within the still is limited.

23. The device as claimed in Claim 12, further comprising:

a waste fluid meter in fluid communication with the still for measuring the amount of waste fluid received by the still;

an actuatable inlet valve operably connected to the still through which waste fluid enters the still; and,

a controller operably connected to the waste fluid meter and the inlet valve to actuate and close the inlet valve upon a predetermined amount of waste fluid being received by the still, whereby accumulation of concentrated fluid residue within the still is limited.

24. A device for extracting a solvent from a waste photopolymer plate washout fluid, comprising:

a tank having a partition therein to form a solvent section for receiving and holding the solvent and a waste fluid section for receiving and holding the waste fluid;

a still operably connected to the waste fluid section for receiving and distilling the waste fluid;

a heat source operably connected to the still for providing heat to the still and the waste fluid contained therein to distill the solvent from the waste fluid and reduce the waste fluid to a concentrated fluid residue; and

a vacuum pump operably connected to the still and the solvent section of the tank for reducing the pressure within the still to assist in distilling the solvent from the waste fluid and reducing the waste fluid to a concentrated fluid residue and to withdraw and transfer the solvent from the still to the solvent section.

25. The device as claimed in Claim 24, further comprising means for supplying a flash-point-increasing to the concentrated fluid residue to increase the flash point temperature of the concentrated fluid residue.

26. The device as claimed in Claim 24, wherein the flash-point-increasing agent is an oil.

27. The device as claimed in Claim 24, wherein the flash-point-increasing agent is selected from the group of oils consisting of paraffinic and naphthenic oils.

28. The device as claimed in Claim 24, wherein the flash-point-increasing agent is a mixture of a paraffinic and naphthenic oils.

29. The device as claimed in Claim 24, wherein the flash-point-increasing agent is added to the concentrated residue in an amount sufficient to increase the flash point temperature of the concentrated residue to a predetermined temperature.

30. The device as claimed in Claim 24, further comprising a vessel containing a flash-point-increasing agent in communication with the waste fluid section of the tank for supplying the flash-point-increasing agent to the waste fluid, thereby increasing the flash point temperature of the concentrated residue upon reduction of the waste fluid.

31. The device as claimed in Claim 24, further comprising a vessel containing a flash-point-increasing agent in communication with the still to provide the flash-point-increasing agent to the concentrated fluid residue, thereby increasing the flash point temperature of the concentrated fluid residue.

32. The device as claimed in Claim 24, wherein the still has a dump opening and further comprises a vessel containing a flash-point-increasing agent in communication with the dump opening to provide the flash-point-increasing agent to the concentrated residue as the concentrated residue is discharged through the dump opening, thereby increasing the flash point temperature of the concentrated residue.

33. The device as claimed in Claim 24, further comprising means for mixing the solvent held in the solvent portion of the tank to substantially blend the solvent into uniform quality.

34. The device as claimed in Claim 24, further comprising a fill pump in fluid communication with the solvent section of the tank and operably connectable with a container of the solvent to withdraw and transfer the solvent from the container to the solvent section.

35. The device as Claimed in Claim 34, wherein the solvent section of the tank has a circulation system and the fill pump is operably connected to the circulation system to circulate and substantially blend the solvent contained within the solvent section.

36. The device as claimed in Claim 24, further comprising a fill pump in selectable liquid communication with the solvent section and the waste fluid section of the tank and operably connectable with a container of a liquid to withdraw and transfer the liquid from the container to the preselected section.

37. The device as claimed in Claim 24, further comprising a solvent meter disposed in fluid communication between the vacuum pump and the solvent section of the tank, whereby the amount of solvent transferred from the still to the solvent section is measured.

5 38. The device as claimed in Claim 37, further comprising:

means operably connected to the meter for discharging the concentrated residue from the still upon a predetermined amount of solvent being transferred from the still to the solvent section.

39. The device as claimed in Claim 24, wherein the still has a dump opening, and further comprises:

an actuatable dump valve mounted to the still at the dump opening;

a solvent meter disposed in fluid communication between the vacuum pump and the solvent section of the tank to measure the amount of the solvent transferred from the still to the solvent section; and,

15 a controller operably connected to the meter and the dump valve to actuate the dump valve and empty the concentrated residue from the still upon the transfer of a predetermined amount of solvent from the still.

40. The device as claimed in Claim 24, further comprising:

a waste fluid meter disposed in fluid communication between the waste fluid section of the tank and the still for measuring the amount of waste fluid received by the still;

5 an actuatable inlet valve disposed in fluid communication between the waste fluid section and the still; and,

a controller operably connected to the waste fluid meter and the inlet valve to actuate and close the inlet valve upon a predetermined amount of waste fluid being received by the still to limit accumulation of concentrated residue within the still.

10 41. The device as claimed in Claim 12, further comprising:

a flange extending outwardly from the still and having an inner periphery defining a manhole;

a closure pivotally and telescopically mounted to the still adjacent the flange for releasably and sealably engaging the flange;

15 at least one wheel rotatably mounted to the closure;

at least one track extending outwardly from the still proximate the flange for engaging the at least one wheel and raising the closure vertically above the flange as the closure pivots; and,

20 at least one clamp to releasably engage the closure for contracting the closure into sealable engagement with the flange.

42. The device as claimed in Claim 41, wherein two wheels are oppositely and rotatably mounted to the closure, and two spaced-apart tracks are disposed on the still to respectively engage the wheels, whereby binding of the closure is reduced as the closure rises above the flange.

5 43. The device as claimed in Claim 24, further comprising:

a flange extending outwardly from the still and having an inner periphery defining a manhole;

a closure pivotally and telescopically mounted to the still adjacent the flange for releasably and sealably engaging the flange;

10 at least one wheel rotatably mounted to the closure;

at least one track extending outwardly from the still proximate the flange for engaging the at least one wheel and raising the closure vertically above the flange as the closure pivots; and,

15 at least one clamp to releasably engage the closure for contracting the closure into sealable engagement with the flange.

44. The device as claimed in Claim 43, wherein two wheels are oppositely and rotatably mounted to the closure, and two spaced-apart tracks are disposed on the still to respectively engage the wheels, whereby binding of the closure is reduced as the closure rises above the flange.

45. ~~A~~ manhole device for a vessel, comprising:

a flange extending outwardly from the vessel and having an inner periphery defining a manhole;

a closure pivotally and telescopically mounted to the vessel adjacent the flange
for releasably and sealably engaging the flange;

at least one wheel rotatably mounted to the closure;

at least one track extending outwardly from the vessel proximate the flange for engaging the at least one wheel and raising the closure vertically above the flange as the closure pivots; and,

at least one clamp to releasably engage the closure for contracting the closure into sealable engagement with the flange.

46. The manhole device as claimed in Claim 45, further comprising a handle extending outwardly from the closure for assisting an operator in pivoting the closure.

47. The manhole device as claimed in Claim 45, wherein two wheels are oppositely and rotatably mounted to the closure, and two spaced-apart tracks are disposed on the vessel to respectively engage the wheels, whereby binding of the closure is reduced as the closure rises above the flange.

48. The manhole device as claimed in Claim 45, wherein the at least one clamp comprises:

the closure having at least one slot;

at least one threaded bolt pivotally mounted to the vessel and removably
5 extending through the at least one slot; and,

a matingly threaded nut adjustably engaging the bolt, whereby as the nut moves toward the closure, the nut exerts pressure against the closure to releasably seal the closure to the flange.

49. A housing for enclosing an ultrasonic sensor, comprising:

an upper wall;

two support walls extending downwardly from the upper wall;

a back wall extending downwardly from the upper wall and between the two support walls, the back wall having an aperture to receive the ultrasonic sensor;

a front wall extending downwardly and outwardly from the upper wall and
15 between the two support walls; and

the top, side, back and front walls defining a housing cavity to receive and enclose the ultrasonic sensor.

50. A process for manufacturing a concentrated residue having a predetermined flash point temperature from a waste photopolymer fluid produced by chemically etching a photopolymer layer of a printing plate with a solvent, the process comprising the steps of:

5 distilling the waste photopolymer fluid to recover the solvent and reduce the waste photopolymer fluid to the concentrated residue; and,

 mixing a flash-point-increasing agent with the concentrated residue in a sufficient amount to raise the flash point temperature of the concentrated residue to the predetermined temperature.

10 51. The process as claimed in Claim 50, wherein the flash-point-increasing agent is mixed with the waste photopolymer fluid during distillation.

52. The process as claimed in Claim 50, wherein the flash point increasing agent is selected from the group of oils consisting of paraffinic and naphthenic oils and a blend thereof.